nostalgic combination lock

018

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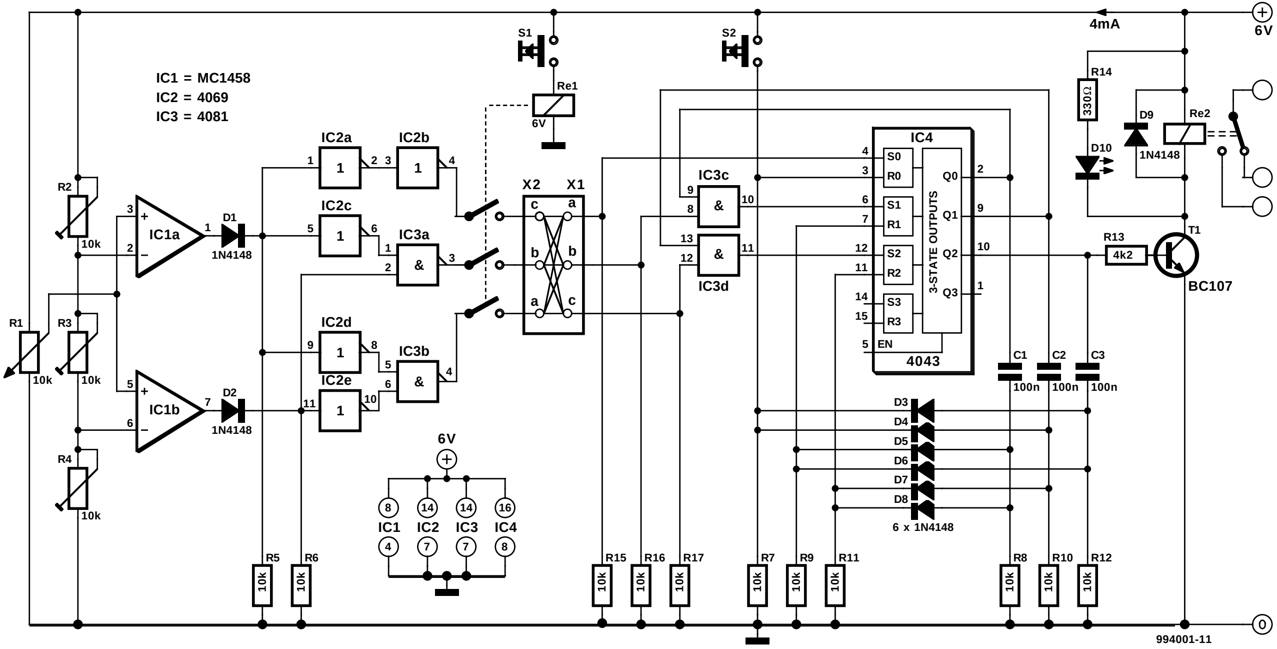
There are many different types of code locks, ranging from numeric keypads through chip cards and magnetic-card readers. The one presented here resembles an old-fashioned combination lock.

IC1a and IC1b are wired as comparators, with reference potentials that can be adjusted using trimpots R2, R3 and R4. Diodes D1 and D2 allow only positive voltages to pass to the subsequent logic gates, contained in IC2a-e and IC3a/b. These gates are connected such that only one of the three contacts of relay K1 will have a high level, according to the setting of R1 (which controls



the output levels of IC1a and IC1b).

If switch S1 is pressed, relay K1 is actuated. If a high level is present at X1a, RS flip-flop IC4a will be set, and the remaining flip-flops will be reset at the same time. If R1 is then repositioned so that a high level is applied to X1b when S1 is pressed, RS flip-flop IC4b will be set in turn. Finally, if R1 is again repositioned and S1 pressed to apply a high level to X1c, RS flip-flop IC4c will be set. This switches on T1, so that the LED D10 lights up and relay K2 is actuated. Relay K2 can be used to energize a door-opener solenoid, as an example. The lock can be reset by briefly pressing S2.

Points X1a-c are connected to points X2a-c by wire jumpers. The desired lock combination can thus be set using trimpots R2-R4 together with these jumpers. Since the reference voltages are analogue, there is theoretically an infinite number of possible combinations.

The circuit draws around 4 mA, plus the currents drawn by the LED and the relays. If a high-efficiency LED is used, the value of R14 must be suitably increased (to 3.9 kΩ).

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